Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_

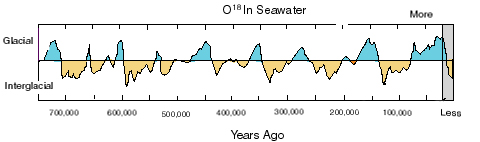
Ice Core Lab

Introduction

Ice cores have been useful tools in order to understand the climate and global conditions over 500,000 years ago. An ice core is a long column drilled into large glaciers or ice masses. Currently there are ice core facilities in Greenland and Antarctica giving us valuable windows into the past. Atmospheric gases, pollen, fossils and Oxygen isotopes ratios are valuable clues scientists use in order to learn how the climate has changed in the past and how to predict how it will change in the future.

Measuring the CO2 content correlates to the amount of life on the planet. Pollen is a good proxy indicator of what plants were in that environment which would tell what kind of climate that period was experiencing. Various other proxy indicators have been found ranging from casts of little critters or hairs of Wooly Mammoths. These fossils indicate what kind of terrain that period was experiencing; terrestrial fossils suggest it was land and aquatic fossils suggest there was water was covering that site during that period.

Oxygen isotopes are used to determine whether it was an ice age or a wet period. Oxygen16 is the most common form in nature, but an isotope O18 does exist in our oceans. The O18 isotope is heavier and is harder to move than the lighter O16 therefore in a period where water is being sucked up and turned into ice, the lighter molecules will be taken first. Scientists use this knowledge and look at the O18/O16 ratio to determine if it was an ice age or wet period.



Key

Blue: O16- If O16 is alone in the ice core that means it is an ice age.

Purple: O18- If O18 is present then it is a wet period

Black: CO2- Correlates to the amount of life currently on the planet

Red: Ash- Levels of ash tell the how recent a volcano erupted

Green: Pollen- Pollen grains trapped in the ice lead us to believe plants were on land when they released it

Brown: Trilobite cast- An early aquatic critter mold tells us that the area the ice core was cut from was covered in water

Procedure

Examine Ice Core 1 and take note of the level of the Oxygen isotope ratio and CO2 levels and describe the current climate.

Slice 1A: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

Climate Summary:

Slice 1B: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 1A:

Slice 1C:

O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 1B:

Slice 1D: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 1C:

Slice 1E: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 1D:

Slice 1F: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 1E:

Examine Ice Core 2 and take note of the level of the Oxygen isotope ratio and CO2 levels and describe the current climate.

Slice 2A: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

Climate Summary:

Slice 2B: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 2A:

Slice 2C: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 2B:

Slice 2D: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 2C:

Slice 2E: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 2D:

Slice 2F: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_

How does this climate compare to 2E:

Examine Ice Core 3 and take note of the level of the Oxygen isotope ratio, CO2 levels, and proxy indicators and describe the current climate.

Slice 3A: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

Climate Summary:

Slice 3B: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

How does this climate compare to 3A:

Slice 3C: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

How does this climate compare to 3B:

Slice3D: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

How does this climate compare to 3C:

Slice 3E: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

How does this climate compare to 3D:

Slice 3F: O16 Count: \_\_\_\_\_\_ O18 Count: \_\_\_\_\_\_ CO2 Count: \_\_\_\_\_\_ Proxy(s):

How does this climate compare to 3E:

Questions

1. Describe the environment in Core 1 and how it changed.
2. What is the relationship between the O18/O16 ratio and CO2 emissions?
3. Describe the environment in Core 2 and how it changed.
4. Is CO2 content the best indicator of climate? Why/Why Not?
5. Describe the environment in Core 3 and how it changed.